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(54) Titre : RETENTEUR DE LIQUIDES AQUEUX ENCAPSULE, PROCEDE POUR SA PREPARATION

(57) Abstract

The invention relates to an encapsulated retainer of aqueous liquids, which consists of a superabsorbant polymer particle, characterised by the fact that said particle is covered with a protective membrane which can decompose and even disappear in order to release said retainer; the membrane consists essentially of a mixture of at least one film-forming polymer and at least one hydrophobic crystalline material. This type of membrane ensures, at least temporarily, the efficient protection of said retainer, and can itself be covered with a second membrane of the same type. The invention also relates to a process for the preparation of this type of encapsulated retainer.

(57) Abrégé

La présente invention a pour objet un rétenteur de liquides aqueux encapsulé, ledit rétenteur consistant en une particule de polymère superabsorbant, caractérisé en ce que ladite particule est enrobée d'une membrane protectrice, susceptible d'être dégradée voire éliminée en vue de la libération dudit rétenteur; ladite membra consistant essentiellement en un mélange d'au moins un polymère filmogène et d'au moins un matériau cristallin hydrophobe ; telle membrane assure au moins temporairement une protection efficace dudit rétenteur. Elle peut, elle-même, être revêtue d'une seconde membrane du même type. L'invention a également pour objet un procédé de préparation d'un tel rétenteur encapsulé.

* Voir au verso

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Aq. liquid retainer comprises super-absorbing polymer particles · encapsulated in protective membrane contg. filmogenic polymer and hydrophobic crystalline material

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(I) Aq. liquid retaining material comprises a superabsorbing polymer (S.A.P.) particle encapsulated in a protective membrane which can be degraded or eliminated to release the retaining agent, the membrane (II) comprising a mixt. of a film forming polymer (FFP) and a hydrophobic crystalline material (HCM) and being pref. itself surrounded by a second membrane (III) also comprising a mixt. as above.

USE/ADVANTAGE - (I) is used partic. in the prodn. of hygienic articles, e.g. diaper, sanitary towels, bandages, etc.. The membrane protects the S.A.P. from premature absorption of water and from aggresive media (pH, temp.) to avoid degradation of the S.A.P..

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Translated by Peggy Ward (K-C)

WO 91/04361 Encapsulated Retainer For Aqueous Liquids, and Process for its Preparation

The present invention relates to a retainer object of encapsulated aqueous liquids. It equally concerns a procedure for its preparation.

The authors, according to the invention, developed a susceptible membrane to protect at least temporarily a retainer for aqueous liquids, notably subjected to severe pH conditions (pH extremes of 0 or 13, for example) and to temperature (neighboring, for example, 70°C). The aforementioned membrane solved *(or cured)* the degradation of said retainer and/or a premature action of water absorption or of physiological liquids leaving *(or by)* the latter. The aforementioned membrane authorizes as well, the liberation, at will, of said encapsulated retainer.

By aqueous liquids, one generally means all liquids containing at least about 50% water and for example water, physiological liquids such as blood, urine ...

By retainer of aqueous liquids, one means in the present application all superabsorbent polymers.

These materials of natural or synthetic origin have been considerably developed during these last 20 years. They are generally known under the abbreviation : S.A.P. ("superabsorbent polymer") and are already utilized in numerous domains/areas. One could site more particularly those of bodily hygiene : of SAP intervening in the elaboration of absorbent articles of the type of diapers, periodic? napkins *(probably feminine napkins)*, paper, compresses...

The SAPs can be used as they are, dispersed in or fixed on the finished product. In certain particular cases, their incorporation would intervene advantageously in the course of the elaboration of said finished product.

In one or the other of these hypotheses, particularly in the second, the macromolecules of SAP can be degraded. In effect, they say SAP degrades itself very rapidly in acidic or basic environment : they lose notably their retaining capacity. In an aqueous environment, they swell immediately.

The authors have therefor wished to resolve the problem of the protection-at least temporarily- of the said retainers of aqueous liquid:

-protection against water, in order to avoid a premature absorption; and/or

-protection against aggressive environments (pH, temperature) in order to avoid their degradation;

This protection first, as weel, permits the required moment *(time)*, the liberation of said retainers by degradation, to see *(seen)* by elimination of the membrane. This degradation, seen elimination can be carried out by all means adapted to the nature of the membrane and to the particular application aiming for the encapsulated SAP.

One such protection proves to be *(turns out to be)* indispensable each time that the incorporation of SAP in a material can introduce a premature action of swelling or water retention by this one and each time that its presence, after incorporation in the material

makes it run the risks of degradation, the said material would undergo various treatments for the elaboration of the finished product.

A premature swelling can intervene in the course of all procedures in which the aqueous liquids would intervene. It is by example the case of incorporation of SAP in the paper, for the obtaining of industrial or household cleaning products, to a strong percentage of water absorption; the said SAP being introduced in the paper pulp which contains some water and cellulose fibers. In the same manner *(way)*, in order to obtain ?nontissé of cleaning, to a strong power of absorption and/or in order to improve its wettability, it is interesting to incorporate the SAP at the stage of ?liage of the fibers, which makes itself by a water spray, impregnation or pulverization of an aqueous dispersion.

The utilization of SAP, protected according to the invention, proves to be equally judicious for the incorporation of said SAP in cellulosic sponges, in the course of the fabrication process of the said sponges.

One can equally incorporate the SAP, protected according to the invention, in an aqueous printing ink, a coating formula?? or an aqueous impregnation formula in oredr to facilitate the drying and the rapid gelification of the polymer in order to congeal the formula and to accelerate the ?réticulation.

In order to assure the protected researched , the authors propose the encapsulation of the superabsorbent polymer particles (SAP) by a specific membrane.

The composition of the said membrane constitutes the key element of the present invention.

The encapsulated retainers of aqueous liquids, according to the invention, consist then of SAP particles coated in a protecting membrane, susceptible to being degraded or even eliminated; the said membrane consists essentially of a mix of at least a ?filmogène polymer and of at least a hydrophobic crystalline material.

The association of these types of materials-?filmogène(s) polymer(s), hydrophobic crystalline material(s)- permits the elaboration of a watertight membrane in the severe conditions (pH basic and/or acidic and/or neutral, of an ambient temperature to temperatures more elevated, or even for example 140°C); a membrane which each time authorizes *(allows)* the liberation of the encapsulated retainer. The degradation, or even the elimination of said membrane, for the liberation of the SAP, can be realized notably by mechanical means (crushing, grinding, ultrasonics), by thermal means (heating, freezing), by ?actinique radiation (UV, IR, electron bundles, microwaves) and by chemical means (pH variation, put in solution, chemical attack). Generally, one liberates the said retainer, by fusion of the hydrophobic crystalline material(s), intervening in the composition of the membrane.

Advantageously, the said membrane materials are of organosoluble compounds. Their solubility in the organic solvents permits the implementation of particular high performance techniques for the coating according to the invention of particles of SAP; techniques which will be described later.